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BRITISH INTELLIGENCE SURVEY

6

SOMALI REPUBLIC

(Section 1: Former Somaliland Protectorate)

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Part VIII (A) (1)

Terrain, Climate and Map Appraisal

Superseded by D/6/VIII A Jan 65

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BRITISH INTELLIGENCE SURVEY ON SOMALI REPUBLIC

(Section 1: Former Somaliland Protectorate)

This report covers the Terrain, Climate and Maps of the former Somaliland Protectorate (now part of the Somali Republic) and is one of a series of reports on subjects of particular interest to Service staffs in the Middle East and Aden. The reports are being distributed also to various departments in London to whom they may be of use. For convenience of users who are not necessarily interested in all parts, to speed up preparation and to facilitate revision, these are being issued separately instead of being bound together.

2. Other parts of B.I.S. D/6 which are being issued in this series are as follows:

Part III (A) Economics and Industry (excluding Oil).
Part III (B) Oil.
Part V Transportation.
Part VII Beaches.
Part VIII (B) Towns.
Part VIII (C) Military Engineering Resources.
Part X (A) Health.
Part X (B) Telecommunications.

3. Detailed information on Airfields and Flying Boat Bases is to be found in J.I.B.5/72 and on Ports in J.I.4/4 (324) P.I. Sheet, Berbera.

4. The date of information in this report can be taken generally as December 1960, except where otherwise stated.

5. Place name spellings are as far as possible those found on the 1:100,000 Map Series GSGS 4868 (Y 623).

6. Requests for further information, including any more detailed documents referred to in the text, should be made to J.I.B. (Whitehall 8474, Extension 637).

7. J.I.B. would welcome the views of users of this report on:

(*a*) any statement considered incorrect;

(*b*) any notable omissions;

(*c*) any means of improving the method of presentation.

8. The Section on Climate has been contributed by the Air Ministry and the map appraisal by the Directorate of Military Survey, War Office.

DIRECTORATE OF MILITARY SURVEY, SURVEY 3
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SOMALI REPUBLIC

(Former Somaliland Protectorate)

CHAPTER 1

TERRAIN—GENERAL

Relief

1. The former Somaliland Protectorate, now the northern province of the Somali Republic, has an area of 68,000 sq. miles, or a little larger than England and Wales. It has a coastline of 450 miles along the Gulf of Aden, and inland its frontiers border on Ethiopia, French Somaliland and the former United Nations Trust territory of Somalia, now the southern province of the Somali Republic.

2. The greater part of the country consists of an arid plateau ranging in height from about 2,000 ft. to 7,000 ft., ending northwards in a prominent limestone escarpment which falls steeply to the coastal plain. The coastline is lined with dunes and salt-flats, marked by small, dry stream-channels, and interrupted in places by lagoons lined with mangrove trees or steep rocky headlands. Behind the dunes is a level sand or gravel plain, narrow and discontinuous in the east but gradually widening to the west to about 40 miles in the Zeila plain. In the central area, the plain is interrupted by numerous limestone ridges dissected by narrow gorges. The escarpment rises steeply behind the plain forming a continuous line in the east where it reaches its highest point at Shimber Beris (7,872 ft.), but round Hargeisa it is more broken and interrupted by deep, narrow valleys. West of Hargeisa the limestone scarps merge with the dissected Harar Plateau of Ethiopia, a region of rugged granite hills divided by small level plains and narrow stony valleys.

3. South of the escarpment the land slopes gradually to a level of 2,000–3,000 ft. At first the terrain is broken and dissected by narrow valleys, but soon it becomes level or gently undulating with a firm sandy surface, reddish coloured in the Haud and Sawl Haud regions, and pale with a salty crust in the Nogal valley. In the north of the plateau a few incised dry *tug* beds are found, but in the south the level surface is interrupted only by shallow depressions and the tall red mounds built by termites. Low limestone hills, flat-topped but with scarp-like sides, stand out from this level surface south and north of the Nogal valley and in the Sawl Haud region.

Drainage

4. The only permanent surface drainage is found in the higher parts of the plateau edge, where deep gorges carry water for all or part of the year. These streams quickly disappear on reaching the coastal plain, often forming wide alluvial fans—*dohes*—at the foot of the hills.

5. The *tugs* (Somali name for a dry watercourse) of the coastal lowlands and the plateau only carry water after the rains (March to May; August to October), when violent spates rarely lasting more than 12 hours come down. The size and strength of the spates depend on the area and rainfall of the catchment area, but in the larger *tugs,* spates 20 ft. deep have been recorded. The water is muddy (about 30 per cent. silt content) and a large amount of driftwood is carried. In the interior plateau, especially in the south, there are few continuous well-defined *tugs,* but many low areas suffer some flooding after rain, when the surface becomes a muddy quagmire. Two major north-west–south-east depressions are found here: the Bokh, running from Odweina to the border at Bohotleh and probably beyond; and the Nogal, a continuation of the Tug Der.

6. Attempts to conserve the water of the *tug* spates and use it for irrigation are now being made. The largest of these is in the Tug Der valley, about 18 miles south-east of Burao, where a dam across the main *tug* holds back the spates and controls flow into the canals. 500 acres are at present irrigated and this can be extended to 800 acres. Smaller, similar schemes are situated at Holholka on the Ethiopian border near Borama, and at Musa Harsan, 15 miles east of Borama.

Another method of irrigation is being tried at Dobowein about 10 miles west of Odweina, where canals and *bunds* (low earthen banks running along the contours) have been built in the alluvial bed of Tug Masingo, to spread and conserve the water of the spates.

Vegetation

7. Despite the low and unreliable rainfall of most of the country, no part is totally barren, although for much of the year the coastal lowlands and the lower parts of the interior plateau are semi-desert. A marked increase in vegetation with altitude is found, and that part of the country over 4,000 ft., where the rainfall is 10–20 ins., carries a certain amount of woodland and juniper forest. This is most luxuriant on the north-facing scarp of the plateau, where all but the steepest slopes carry thick bush or woodland. Several forest reserves have lately been set-up, with excellent results in increased vegetation. The plateau grasslands of the Haud and Sawl Haud cover an extensive area in the south; large parts are bare of vegetation in the dry season.

Settlement

8. About 90 per cent. of the Somali population is nomadic to some degree. Only 5 per cent. are permanent town dwellers, although a number of the nomadic stock-herders live temporarily in towns. The other 5 per cent. of the population are settled agriculturalists, found mostly in the western plateau, where rainfall is highest. Small farms, using fairly primitive methods, grow sorghum, maize and vegetables.

9. The settlements on the coastal lowlands are mostly small collections of semi-permanent huts with wattle-and-daub walls and flat roofs supported on wooden frames. In the plateau area, where the main grazing land of the country is found, the people live in small huts which consist of mats and skins spread over a 12 ft. diameter, semi-circular wooden frame. These are packed on camels when the tribe moves. Many of the tribes seek additional grazing by crossing the frontier into Ethiopia.

Effect of Terrain on Military Operations

10. Over three-fifths of the country consists of flat featureless plains, with a sparse vegetation cover and no rivers. In these areas, that is, most of the interior plateau and upland plains, cross-country movement is easy. Occasional patches of rough stony surface and areas of dense thorn bush make rough going, and tall termite mounds break the surface in places. *Tugs* or dry valley floors are rarely steep-sided and can usually be crossed without difficulty. The low flat-topped limestone ridges surrounding the Nogal and Sawl Haud areas provide poor going, but they can usually be avoided.

11. The remaining part of the country is not very suitable for military operations. From latitude 44° 30′ E., the steep escarpment forming the edge of the interior plateau is a serious obstacle to north-south movement. Much of the coastal lowlands is also difficult to cross, especially in the east.

12. After rain, which is usually heaviest in April to May and September to October, movement is generally halted for up to 48 hours by sudden spates of water in the *tugs* and by flooding in shallow depressions in the interior plateau. The salt-flats lining most of the western shoreline are also flooded and become impassable.

13. On the interior plateau and the coastal plain, concealment for any large body of troops on the move is difficult by day owing to the dusty surface and the absence of any trees, except along *tugs*. Limited cover is provided by the broken terrain in parts of the coastal lowlands and the eastern half of the plateau region. The plateau edge region, with its deep valleys and fairly dense vegetation, including areas of juniper forest, provides excellent cover and concealment for small forces.

14. Good sites for airfields are available on the interior plateau and parts of the coastal plain, but lack of water supplies, and, in the interior plateau, of easy access routes, could be limiting factors. Airborne operations would also be possible over these areas, but the same limiting factors apply.

CHAPTER 2

TERRAIN REGIONS

Introduction

1. There are three major regions—the Coastal Lowlands and Foothills, the Plateau Edge and the Interior Plateau and Plains—clearly distinguished from each other in relief, drainage and vegetation. Their limits are shown on Map 2 (at end), and each is described in a separate table below.

Regional Breakdown

1. Coastal Lowlands and Foothills
   - (*a*) Western Foothills and Zeila Plain
   - (*b*) Central Coastal Plain and Limestone Hills
   - (*c*) Eastern Foothills and Coastal Plain
2. Plateau Edge
3. Interior Plateau and Plains
   - (*a*) The Haud
   - (*b*) The Sawl Haud
   - (*c*) Nogal and Daror Valleys and surrounding Hills

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REGION 1.—COASTAL LOWLANDS AND FOOTHILLS

Relief and drainage	Vegetation	Settlement	Suitability for military operations
(*a*) Western Foothills and Zeila Plain Barren waterless sand plain (40 miles in width behind Zeila, maximum width 60 miles), bordered in the south by low rocky hills. Coastal salt flats are backed by a belt of low sand dunes 2–3 miles wide (see photograph 1). Inland hilly areas interrupt the plain. The southern parts of the region consist of low hills and ridges divided by hard gravel plains Plain is crossed by several fairly large *tugs* or dry water channels which carry water after rain. They have wide sandy bottoms and in the hills have steep and rocky sides	Coastal area supports some mangrove forests and extensive low salt bush vegetation. *Tug* belts support thorn trees. In the dry season, the plain is bare but for scattered low thorn bushes; after rain it has a light grass cover. In the southern hills, vegetation consists of small scattered clumps of thorn bush and ephemeral grass cover	There are few permanent settlements apart from ports and small fishing villages and irrigated areas in the southern hills. The majority of the people are nomadic herdsmen	This section of the coastal plain presents few obstacles to movement but lack of water is a problem. Scattered bush vegetation and dry cracked ground can slow going. *Tugs* are sometimes difficult to cross, with soft sandy beds: when in spate they could halt movement for some hours. The coastal salt flats are impassable for weeks after flooding though the backing dunes are passable (most rain falls April to May). Dust storms reduce visibility in summer Vegetation provides little cover but broken terrain gives some. Many suitable areas for airfields or dropping zones exist in the Zeila plain but lack of water is an obstacle
(*b*) Central Coastal Plain and Limestone Hills Sand and gravel plains broken by steep dissected limestone hills and ridges trending north-west to south-east. The coast has low shifting dune areas separated by gravel areas and steep rocky outcrops which form headlands. In the east salt and mud flats replace dunes Many small *tugs* drain from the hills into the plain, forming small delta-like areas which sometimes flood after rain	Low salt bush in coastal areas with some dense mangrove forest. *Tug* beds support acacia and thorn bush. The plain areas have a cover of sparse thorn bush	There are few permanent settlements apart from ports and small fishing villages and irrigated areas in the southern hills. The majority of the people are nomadic herdsmen	East–west movement is possible along the coast but rarely easy. The western dunes are passable, but only to jeeps with sand tyres in some places; in the east the salt flats are impassable after rain. These areas can be avoided by movement along the beach at low tide or by moving inland. The coastal ranges of Guveneh and Ferrio, are impassable; inland they overlook the Las Dureh–Dur Elan plain which provides a corridor for movement crossed by the road from Berbera to Erigavo Vegetation gives little cover but very broken terrain in many areas would give some Most of the region is too broken for dropping zones or airfields; best areas are the sandy and stony plains in the west
(*c*) Eastern Foothills and Coastal Plain The escarpment comes near to the coast here and the plain is only 10–20 miles wide, backed by low stony hills which occasionally reach to the coast (see photograph 2). East of the Manna Hills the plain is sandy, but to the west is stony and rough There are many small *tugs* with sandy beds often boulder strewn	Scattered succulents and thorny shrubs. Hills are bare but higher parts support thorny trees and shrubs	There are few permanent settlements apart from ports and small fishing villages and irrigated areas in the southern hills. The majority of the people are nomadic herdsmen	Movement is generally difficult. *Tugs* can necessitate diversions and stony surfaces in the plain slow movement. The hills are virtually impassable to vehicles but provide some cover Only possible areas for airfield construction or dropping zones are in the sandy plain south of Elayu but lack of water and inaccessibility are problems

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REGION 2.—THE PLATEAU EDGE

Relief and drainage	Vegetation	Settlement	Suitability for military operations
The northern edge of the interior plateau forms a steep north-facing escarpment rising 4,000 ft. from the coastal plain. It trends east–west across the country except around the Asseh Gap where the trend is north-west–south-east. The peaks range from 4,600 ft. near Hargeisa to 7,872 ft. at Shimber Beris. There are few gaps in the mountains West of the Asseh Gap the escarpment is lower and more broken and west of Hargeisa it merges with the plateau of Ethiopia. The Sheikh Pass south of Berbera is one of the chief breaks in the escarpment (see photograph 3) Behind the escarpment the land slopes southward: the terrain is much gentler, but still rugged and broken Streams are small and run in steep-sided valleys, becoming torrents after heavy rain. In limestone areas drainage is often sub-surface	This region receives a higher rainfall than the rest of the country, and vegetation is luxurious. Cutting has reduced the forested areas. Elsewhere there is a good cover of grass and shrubs. The north-facing slopes support the thickest vegetation	There is a considerable number of settled agriculturalists apart from the usual nomadic herdsmen	The escarpment is a formidable barrier to movement between the coast and the interior. Penetration is possible up the *tug* beds or small gravel plains but generally the northern slopes are too steep for any motor transport and often for camels or foot troops. In the west, to about longitude 44° 30′ E. motor tracks through the region can be found but going is poor because of stony surfaces and thick bush cover. In the wet season, torrents stop movement. East of 44° 30′ E., apart from the winding roads through the Sheikh Pass and the Tabah Pass, the only motorable gap is the Asseh Gap Cover is generally good, especially in the northern areas There are no possible sites for airfields or dropping zones in this region

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REGION 3.—INTERIOR PLATEAU

Relief and drainage	Vegetation	Settlement	Suitability for military operations
(*a*) THE HAUD Extensive sandy plateau, flat and featureless and for part of the year waterless. Surface slopes gently to broad north-west–south-east valleys of the *Tug* Der and Bokh depression. In the north bordering the escarpment and along the boundary with the Nogal valley are small areas of low dissected limestone hills. Termite mounds reach 20 ft. There are no streams or rivers and only permanent water comes from wells. The wet season (April–May) fills the *tugs* and collects in wide depressions called *ballehs* often several acres in extent	Most of the country has a tussocky grass cover with some scrub, cactus and acacia vegetation In the north grazing and erosion has produced barren dune country around the wells (*e.g.*, near Burao)	Population is predominantly nomadic, moving with herds. Only permanent buildings, apart from towns, are isolated stone or mud huts at water holes, or at cultivated areas in the north	There are no major terrain obstacles to movement: slopes are gentle and there are no rivers: going varies from good to poor. The surface is usually firm sand but tussock grass and shrubs slow transport. The low limestone hills and termite mounds can be avoided. Seasonal spates in *tugs* and dust storms in the dry season can halt movement Cover is poor and dust rising from moving vehicles slows movement Many level areas are suitable for airfield construction and dropping zones but only if cleared of vegetation; lack of water and inaccessibility are limiting factors
(*b*) SAWL HAUD An outer ring of featureless sandy plain similar to the Haud slopes gently to the salt-covered Heman basin. Area is bordered, except on the north-west, by an outward-facing limestone scarp 150 ft. high There are few *tugs*. The Durero is steep-sided. There are a few small *ballehs* but these rarely hold water for more than a month	Scrub grass and thorn bush with a few acacia trees	Nomadic stock herdsmen bring in their animals after the April rains, but no permanent settlements of more than a dozen inhabitants are found	The surface is generally good for movement and occasional gravel patches and termite mounds can be avoided There is very little cover, and dust would betray movement There is much level land suitable for airborne operations but water and poor communications are problems
(*c*) NOGAL AND DAROR VALLEYS AND SURROUNDING HILLS (see photograph 4) This region comprises the wide open depressions of the Nogal valley (continuing south-east from the *Tug* Der), the smaller Daror valley and the steep dissected limestone hills surrounding the plains. The plains are undulating with a white sandy surface with salt crust. Near the hill areas the surface is rock-strewn and eroded by *tug* beds Neither the Nogal nor the Daror valleys carry water along their whole length at one time. A few defined watercourses run into them, carrying water after rain. There are a few *ballehs*	Tussock grass and thorn scrub with some succulents. Acacia and fig trees near wells, sink holes and *tug* beds	A few small permanent settlements of mud huts, usually at foot of hills and near a permanent well. Most of the population are nomadic herdsmen	Movement generally easy over level and firm surface of the plains with no vegetation obstacles. Limestone hills are impassable in places but gaps exist. Going near the hills over rock-strewn plains can be difficult There is no cover in the plain areas Many good sites for airfield construction and dropping zones in the Nogal and Daror valleys, but not in the hill areas

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CHAPTER 3

CLIMATE

General

1. The climate of the former Somaliland Protectorate is tropical monsoonal in type, with marked seasonal contrasts in wind direction and high temperatures at all times of the year. Rainfall is variable both from place to place and from year to year; on the coast it is normally scanty, but over high ground inland it is appreciable, though irregular in occurrence. The seasonal changes are described below and details are also given of the main climatic factors as they affect different parts of the country. The influence of climate on operations is described on page 13. Detailed climatic statistics are given in Appendix 1.

Seasonal Weather and Weather Changes

2. Broadly speaking, the year may be divided into two main seasons, the summer, or south-west monsoon, season from June to September and the winter, or north-east monsoon, season from December to March; the two main seasons are separated by two short transition periods, spring (April and May) and autumn (October and November). The onset of the various seasons varies somewhat from year to year and, at times, the transition period (particularly autumn) may be abrupt.

3. Winter (December to March) is the coolest period of the year, but temperatures are often high, particularly in the coastal areas. Over the high ground, at heights of 5,000 ft. and above, nights are often clear and frosts occur at times. Cloud amounts are small, by British standards, and there are many fine days. Precipitation amounts are small in all areas but, along the coastal plain, are as high as at any time in the year. Winds are generally from a north-easterly direction.

4. Spring (April and May) is a short transition period when temperatures generally rise quickly. In some inland places, at high levels, this is the hottest season of the year. Heavy showers or thunderstorms, over the high ground, make this the season of maximum precipitation in some areas. Winds are mainly north-easterly, but are more variable than in the winter.

5. Summer (June to September) is the season of the south-west monsoon and is the hottest time of the year on the coasts; it is also the season of highest wet bulb temperature in coastal areas. Rainfall on the coast is small and erratic, but heavy showers occur at times. Inland, on the slopes of high ground exposed to the south-west monsoon, this is the wettest season of the year. Winds are mainly south-westerly and are often strong or gale force in some areas.

6. Autumn (October and November) is the season of rapidly falling temperatures. In some areas there is a secondary maximum of precipitation at this season. Winds are somewhat variable in direction, but more north-easterly than south-westerly.

Temperature (see also Tables 2–4 at Appendix 1)

7. Temperatures along the coast are high throughout the year and the annual mean (85°F.) is about as high as anywhere else in the world. Temperature conditions inland are modified by altitude; there is, on the average, a decrease of about 3°F. in mean temperature for each 1,000 ft. increase in altitude.

8. *Winter* (*December to March*).—January is usually the coldest month. In coastal areas mean monthly temperatures in January are around 76°F. Inland temperatures are lower according to altitude, averaging around 62°F. at Borama (4,900 ft.), 65°F. at Hargeisa (4,377 ft.) and 59°F. at Erigavo (5,700 ft.). Maximum day temperatures in January average about 84°F. on the coast, but temperatures as high as 95°F. have been recorded in this month. Inland, corresponding mean maximum temperatures are 74°F. at Borama, 77°F. at Hargeisa and 76°F. at Erigavo; highest recorded January temperatures are 86°F. at Borama, 88°F. at Hargeisa and 87°F. at Erigavo. Night minimum temperatures in January average around 68°F. to 70°F. on the coast, but temperatures as low as 52°F. have been recorded. Inland, temperatures are lower according to altitude, night minimum

temperatures averaging 50°F. at Borama, 51°F. at Hargeisa and 42°F. at Erigavo; temperatures as low as 25°F. at Borama, 31°F. at Hargeisa and 26°F. at Erigavo have been recorded in January.

9. *Summer* (*June to September*).—June or July is usually the hottest month. In coastal areas the mean monthly temperature in July is 94° to 97°F., according to location. Inland, temperatures are lower according to altitude, averaging 76°F. at Borama and Hargeisa in June and 67°F. at Erigavo in July (and August). Maximum day temperatures in July average about 105° to 107°F. in coastal areas and temperatures as high as 118°F. have been recorded in this month. Inland, daily maximum temperatures average 88°F. at Borama and Hargeisa in June. At Erigavo the highest mean daily maximum temperature (80°F.) occurs in April and May. Temperatures as high as 96°F. at Borama (in July), 97°F. at Hargeisa (in June) and 87°F. at Erigavo (in July) have been recorded at this season. [*Note.*—The highest temperature observed at Borama (97°F.) and at Erigavo (92°F.), in a 12–14-year period, occurred in April.] Night minimum temperatures in July average 83°F. to 88°F., according to location, on the coast but temperatures as low as 69°F. have been recorded in this month. Inland, on the high ground, temperatures are normally lower and the corresponding July temperatures are mean daily minima of 63°F. at Borama and Hargeisa and 56°F. at Erigavo. Temperatures as low as 45°F. at Borama, 58°F. at Hargeisa and 41°F. at Erigavo have been recorded.

10. The diurnal range of temperature averages about 20°F. to 25°F. both in the summer and in the winter although short period averages for some stations indicate some variation, locally, from these figures. On individual occasions, of course, at any station, variations much greater than, or less than, the average may be experienced.

Humidity

11. The average relative humidity on the coast, at 0800 hours local time, is about 75 per cent. in the winter and spring (December to May), 45 to 50 per cent. in summer (June to September) and 70 per cent. in autumn (October and November). At 1400 hours it is about 65 to 70 per cent. in winter and spring, 45 to 50 per cent. in summer and about 65 per cent. in autumn.

12. Inland, available records are mainly for short periods (and largely for one hour per day) but they indicate wide variations in relative humidity from place to place, *e.g.*, Hargeisa has a mean relative humidity, at 0600 local time, of 85 per cent. in winter and 70 per cent. in summer; at 1500 local time it is about 35 per cent. in both winter and summer whereas at Gudubi the relative humidity, at 0830 hours, averages around 45 per cent. in winter and 40 per cent. in summer.

Precipitation

13. Average precipitation amounts are small along the coast and at many inland places, being generally less than 15 ins. a year except on south-west facing slopes on the mountains. On the coast, average annual precipitation is generally less than 5 ins. Precipitation may occur in any month, usually in the form of showers or thunderstorms, but the wettest months are normally from April to September, *i.e.*, in the spring transition period and during the south-west monsoon. Precipitation is likely to be erratic, particularly along the coast; although average amounts are small, individual yearly totals vary considerably.

14. On the coast, the mean annual precipitation is 4 inches at Zeila, and only 2 ins. at Berbera.

15. Inland, mean annual precipitation amounts vary from about 5 ins. at Las Anod to 16 ins. at Hargeisa, and about 20 ins. at Sheikh and Borama. Short period (5 to 7 years) records indicate average annual falls of about 24 ins. at Go'o (5,220 ft.) and 33 ins. at Daloh (6,780 ft.).

Variability of Precipitation

16. The figures for average monthly and annual precipitation may be misleading at times, since precipitation is often in the form of heavy (or very heavy) showers or thunderstorms which are localised. In consequence, yearly totals, at any one place, vary greatly from year to year, especially in places of low average rainfall (for example, at Zeila, where the mean annual rainfall is about 4 ins., in a

14-year period individual yearly totals varied from 10·8 ins. to 0·5 ins.). The rainfall totals for any one year at a particular place may therefore often show little similarity to the long period average.

Average Number of Days with Precipitation (*Trace or More*)

17. Information regarding number of days with precipitation in this area is limited. However, it appears that the average number of days a year with a trace of rain, or more, is about 8 on the coast and some 50 to 60 inland.

Heavy Falls in 24 Hours

18. Although precipitation amounts are generally small, heavy falls occur at times in most parts and falls of 3 to 5 ins. in a day have occurred at many places. At Berbera, for example, where the mean annual rainfall is only 2 ins., a fall of 5·2 ins. in one day has been recorded in March and over 2 ins. in a day have been measured in both April and May; at Zeila 5·7 ins. of rain fell in one day in November. Inland, falls of 3 ins., or more, in a day have been recorded at Sheikh, Borama, Burao and Erigavo.

Thunderstorms

19. Information on thunderstorms in the area is limited but, at Berbera, they occur on 9 days a year, on the average, and are most frequent (3 days a month) in May. Inland, at Hargeisa, they occur on about 41 days a year, averaging 6 or 7 days a month from May to September. At times they may not be accompanied by precipitation but may be associated with a dust or sandstorm.

Hail.

20. Hail occurs at times, usually in association with thunderstorms, but is infrequent.

Cloud

Cloud Amount

21. Cloud amounts are, on the average, small and are generally much less than over South-East England, but precise information is sparse over much of the area. On the coast, mean daily cloud amounts are 2 to 3 eighths at all seasons (compare Kew (London) about 5 to 6 eighths); inland, they are 2 to 4 eighths. The diurnal variation of cloud amount, during the north-east monsoon period, is small. Cloud amounts average some 2 to 3 eighths on the coast and 2 eighths inland. In the south-west monsoon season there is again little diurnal variation of cloud amount on the coast apart from a slight decrease in amount, in the evening, in the east. Inland, at Hargeisa, however, there are 2 to 3 eighths in the morning (0900 local time), 4 to 5 eighths in the afternoon (1500 local time) and 3 to 4 eighths in the evening (2100 hours local time), on the average.

Types of Low Cloud

22. The predominant type of cloud is usually cumuliform during the day but low stratus forms, at times, during the night and normally disperses soon after sunrise. In the south-west monsoon season, large cumulus or cumolonimbus cloud develops at times, mainly over inland areas. In the north-east monsoon season, low stratus forms, frequently, at night over the hills but usually disperses during the morning. In the afternoon the predominant cloud is fair weather cumulus, but large cumulus or cumulonimbus develop on a few occasions.

Very Low Cloud (*Base Below 1,000 ft.*)

23. Very low cloud (base below 1,000 ft.) is infrequent on the coast but inland it is common in some areas particularly during the north-east monsoon season (December to March). On the coast very low cloud is rare at any season, so far as available records show. It occurs, on the average, on less than 2 per cent. of occasions, in any month, at either 0500, 0900, 1500 or 2100 hours, local time. Inland, at Hargeisa, very low cloud occurs, during the north-east monsoon season, at 0900 hours local time, on about 5 per cent. of occasions; at 1500 hours it is very infrequent but at 2100 hours it occurs on about 1 per cent. of occasions. In the months of April to October very low cloud occurs on 1 per cent. (or less) of occasions at any of the three hours of observation.

VISIBILITY

24. Observations of visibility are available only for Berbera and Hargeisa.

25. Visibility is generally good or very good, over the year as a whole. On the coast, it is good (over 6¼ miles) on some 80 to 90 per cent. (more in some months) of occasions, on the average, at all four hours of observation, over the whole year; in the summer months, however, the frequency may fall to 70 per cent. or so, at times. Poor visibility (less than 2½ miles) is generally very infrequent throughout the year but, in January and February it is quite frequent at 0500 hours, local time, when it occurs on some 20 per cent. of occasions, on the average. Fog (less than 1,100 yards) occurs very infrequently at any hour of the day in any month. Inland, over high ground poor visibility is more common than on the coast, probably because of cloud on the surface. It occurs, on the average, in winter (December to March) on some 8 to 10 per cent. of occasions at 0600 local time, but is infrequent at 0900, 1500 and 2100 hours. Fog (less than 1,100 yards) occurs on some 7 per cent. of occasions at 0600 hours local time. In summer (June to September) poor visibility is seldom experienced.

Duststorms

26. It is probable that duststorms occur from time to time, particularly in the interior and on the coastal plain in the west, but precise data is very sparse.

Mirage

27. Mirage undoubtedly occurs at times both inland over the plain and over the sea, and in such circumstances the shapes of objects may be greatly distorted and the distances of objects seriously misjudged. However, the effects can be greatly minimised by ascending a few feet above the surface.

WINDS

28. The prevailing winds are the north-east monsoon in winter (December to March) and the south-west monsoon in summer (June to September) but the prevailing directions (and the wind speeds) are much modified locally by the land and sea breeze effect and by local topography; in particular, in the west, near the Straits of Bab-el-Mandeb, there is a predominance of east to south-east winds in winter and north to north-west winds in summer.

29. In the summer (June to September) winds are mainly from the south or south-west (on 80 to 90 per cent. of occasions) in the morning and evening, over the area as a whole. In the afternoon they are somewhat more variable but, on some 70 to 80 per cent. of occasions, are from between south and west.

30. In the winter (December to March) north-easterly or easterly winds predominate, occurring on the coast, on some 60 to 80 per cent. of occasions, in the west at 0900 hours and 1400 hours and in the east at 1400 hours local time. (At 0800 hours in the east some 50 to 60 per cent. of occasions are calm.) Inland, winds are from north or north-east on some 60 to 80 per cent. of occasions according to location and time of day.

Wind Speeds

31. Light winds (Beaufort force 3 or less) predominate in the winter (December to March). On the coast the wind is light on some 95 per cent., or more, of occasions at 0900 hours and 50 to 55 per cent. at 1400 hours, local time, in the east, but are probably somewhat less frequent in the west. Inland, the frequency of light winds will undoubtedly vary considerably with location and time of day; at Hargeisa they occur on some 75 to 85 per cent. of occasions, on the average, at all three hours of observation (0900, 1500 and 2100 hours, local time). In summer (June to September) winds are light, at 0800 hours, local time, on some 20 to 30 per cent. of occasions (less than 5 per cent. in July and August) on the coast; at 1400 hours the frequency is 60 to 70 per cent., on the average, according to location. Inland, at Hargeisa, light winds occur on about 10 per cent. of occasions at 0900 hours and 70 to 75 per cent. at 1500 and 2100 hours, local time, on the average.

32. Strong winds (Beaufort force 6 or more) occur quite frequently during the south-west monsoon period, especially in the morning. On the coast they average around 25 to 30 per cent. of occasions at 0800–0900 hours but are more

frequent in some localities (*e.g.*, at Berbera they average between 40 and 60 per cent. of occasions); in the afternoon they are less frequent, averaging some 5 to 10 per cent. of occasions. Inland, at Hargeisa, strong winds occur on some 35 per cent. of occasions, on the average, at this season at 0900 hours; at 1400 hours they occur on about 2 per cent. of occasions. In winter (December to March) strong winds are infrequent, at 0900 hours, on the coast; at 1400 hours they average some 5 to 10 per cent. of occasions, according to locality. Inland they occur, on the average, on 1 per cent. or less of occasions at all three hours of observation, so far as available records show.

33. Gales (Beaufort force 8 or more) are frequent in the morning, at Berbera, during the south-west monsoon when they average some 25 to 35 per cent. of occasions at 0800 hours local time in June and July and some 20 per cent. in August. In the afternoon (1400 hours) they are most frequent in July when they average about 3 per cent. of occasions. At other places on the coast gales appear to be less common, averaging some 5 per cent. of occasions in the morning and 1 to 2 per cent. in the afternoon. Inland, at Hargeisa, gales occur on 3 to 6 per cent. of occasions, at 0900 hours, in June and July, and very seldom at 1400 hours. In August and September gales seldom occur. In the north-east monsoon season or in the transition seasons gales are infrequent at any hour of observation, either inland or on the coast.

Local Winds

34. Land and sea breezes are well marked along the coast. The sea breeze is especially noticeable during the south-west monsoon period when, if the monsoon is weak, it may cause in some areas a complete reversal of wind direction in the middle of the day. During the north-east monsoon the sea breeze is less marked; it may cause either some slight modification of wind direction or some increase in speed (or both). Night land breezes are most common in the north-east monsoon season. In the south-west monsoon season they strengthen the prevailing wind and, where the mountains are close to the coast, may cause the wind in the early morning to be gusty and squally.

35. The Kharif is the name given to a strong south-westerly wind which blows on the south coast of the Gulf of Aden, during the south-west monsoon. It is a katabatic wind and is particularly strong at Berbera and for some distance east, where the land slopes steeply to the sea. The Kharif blows chiefly at night and usually attains its maximum speed at about 0900 hours, local time, and normally dies out during the day. However, it may, at times, persist all day. It is a hot, dry wind and, even at night, temperatures may be as high as 100°F.

36. Tropical cyclones are exceptional, but during the period 1879 to 1944, three or four have been known to enter the Gulf of Aden and have affected the neighbouring coastal areas. One such storm, in June 1885, passed along the Gulf of Aden from the west and caused severe damage in French Somaliland. Tropical cyclones are most likely to occur, in this area, in May and June or in October and November.

CLIMATIC FACTORS AFFECTING MILITARY OPERATIONS AND SUPPORTING AIR OPERATIONS

PRECIPITATION

37. For the greater part of the year precipitation is not likely seriously to affect cross-country movement although rain may cause some dislocation of traffic at times. Rainfall may cause interference at times between April and September (or October) when the greater part of the rain falls in most areas. During the winter (December to March) little interference is likely except in isolated heavy showers or thunderstorms. Snow is unlikely ever to be a serious factor.

38. Most of the precipitation is in the form of showers or thunderstorms, which may be heavy at times. Such heavy showers may occur in any area but are most likely to occur in mountain areas, particularly on the slopes exposed to the south-west

monsoon; however, very heavy falls of rain have occurred on the coast. Over 3 ins. of rain have been recorded in a day at a number of places. After heavy rain flooding is likely and low-lying areas may become waterlogged.

Temperature

39. Temperatures are high in summer in most areas, reaching over 100°F. on the coast and in parts of the interior. Such intense heat combined with the fierce glare of the sun makes conditions very trying and extremely uncomfortable. In winter temperatures are lower, but they remain high in the coastal strip.

Visibility

40. Generally speaking, radiation fogs are not a serious hindrance to cross country movement. However, they probably form inland in valleys, particularly in the early morning after rain; they are unlikely to persist long after sunrise.

41. Visibility may be much restricted by sand-storms or dust-storms at times and may, on some occasions, be reduced to fog limits (less than 1,000 yards) in severe storms. These conditions are most likely to occur on the dry, arid coastal plain in the summer months of June to September.

Surface Winds

42. For much of the year the winds are light or moderate in strength and would not interfere seriously with operations. Strong winds (Beaufort Force 6 or more), however, occur fairly frequently in summer (June to September), especially in the morning. For further details of surface winds see p. 12 above and Appendix 1.

Sea and Swell

43. During the south-west monsoon (June to September) moderate seas are fairly frequent and very rough seas may occasionally be experienced, owing to the reinforcement of the monsoon by local winds along the coast. During the north-east monsoon (December to March) moderate to rough seas are less frequent and are recorded mostly in the west, towards the Straits of Bab-el-Mandeb.

44. For the percentage frequencies of swell and of wave heights see Appendix 1.

Upper Winds

45. The table below gives, for Berbera, the estimated mean vector wind and standard vector deviation (S.V.D.) for various pressure levels.

Estimated Mean Vector Wind and Standard Vector Deviation (S.V.D.) for Various Pressure Levels over Berbera (10° 26′ N., 45° 02′ E.)

Pressure level	Height I.C.A.N.	January			April			July			October		
		Mean		S.V.D.	Mean		S.V.D.	Mean		S.V.D.	Mean		S.V.D.
mb.	ft.	Dir. deg.	Speed kt.	kt.	Dir. deg.	Speed kt.	kt.	Dir. deg.	Speed kt.	kt.	Dir. deg.	Speed kt.	kt.
700	9,900	090	10	10	040	08	11	Var.	Light	14	030	10	11
500	18,300	Var.	Light	14	060	08	15	020	10	16	090	10	15
300	30,100	250	10	20	270	10	18	110	20	10	090	06	17
200	38,600	270	12	27	290	15	24	080	40	15	150	10	25
100	53,000	300	08	20	Var.	Light	20	100	60	17	110	12	20

Jet Streams

46. In mid-summer (July) a belt of strong easterly winds develops over Southern Arabia at heights of 35,000 ft. and above. The mean axis of the jet stream usually lies in latitude 15°N., but former Somaliland Protectorate is affected at times. The jet stream blows from almost due east and, during July, mean wind speeds reach 60 knots whilst maximum speeds occasionally exceed 100 knots. These easterly winds usually attain their greatest speeds between 45,000 and 50,000 ft.

Cloud

47. For details of cloud amounts see p. 11 above and Appendix 1.

Turbulence

48. Turbulence and strong vertical currents may occur in cloud, particularly in cumulonimbus, or large cumulus. This type of cloud may occur at any time of the year in most areas, but is most likely between April and September in mountain areas. In hilly and mountainous country vertical currents and eddies are common. They are most likely to occur when the wind speed exceeds 15 knots, especially in bright sunshine. Severe turbulence may also occur over plains and plateaux, during the daytime, in hot weather. Clear air turbulence may also be encountered at heights of 30,000 ft. and above, in association with jet streams.

Icing on Aircraft

49. The average height of the 0°C. isotherm is about 15,500–16,000 ft. throughout the year.

50. The table below gives the average height of the freezing level over Berbera in January, April, July and October.

Average Height of Freezing Level (in ft.)

Position	January	April	July	October
Berbera	16,000	16,500	16,500	15,500

51. Icing on aircraft may occur in any cloud at temperatures below freezing point, but is most likely to occur in large cumulus or cumulonimbus cloud or in unstable medium cloud. Large cumulus or cumulonimbus cloud is most likely to occur during the south-west monsoon (June to September) or in the transition periods (March–April or October–November); the icing risk is, therefore, normally greatest at these times.

Propagation of Radar

52. Widespread trapping of emissions on metric and centimetric wavelengths occurs over the Arabian Sea during the north-east monsoon, but, as far as is known, this does not in general extend westward as far as the Gulf of Aden. The transitional season, covering the months March to May, is favourable for trapping of centimetric waves in the Gulf, and super-refraction may be observed, though with diminishing frequency, in June and even July. As the south-west monsoon develops, however, propagation conditions become more normal and remain so for the rest of the year.

53. Over the land, in view of the hilly terrain and spasmodic fluctuation of the winds, it is difficult to generalise in the absence of reports. Extended ranges would be expected only early in the day during the cool season (November to February) and would generally affect transmissions from low-sited aerials only.

Flying Weather

54. Flying conditions, on the whole, are very good and much better than over the British Isles. The main hazards are poor visibility due to dust or sand and, to a lesser extent, low stratus covering hills in the early morning.

55. During the north-east monsoon (December to March) the prevailing wind is from north-east or east, but this direction is modified by local topography and by the land and sea breeze effect. Winds are usually light or moderate; strong winds occur quite frequently (20 per cent. of occasions) in the west near the Straits of Bab-el-Mandeb but are infrequent in the east. Gales do not often occur. Squalls are experienced at times, especially in association with heavier showers or thunderstorms; they may give temporary increases in wind speed to Beaufort Force 6 or more. Cloud amounts and precipitation are small by English standards and fine days are frequent. Rainfall, when it occurs, is usually of the showery type, with some

thunderstorms. Cloud amounts probably average around 2 to 3 eighths in most coastal areas. Very low cloud (base below 1,000 ft.) is seldom experienced. Visibility is usually good, or very good; it is, however, reduced to poor on a few occasions in sand or dust storms or in heavy rain.

56. During the south-west monsoon (June to September) the prevailing wind direction is south-westerly, modified by local topography and the land and sea breeze effect. Winds are generally light or moderate in most areas but are often strong, or even gale force, in the mornings in the vicinity of Berbera. There is little rain on the coast at this season. Average cloud amounts are 1 to 2 eighths in the Berbera area. Very low cloud (base below 1,000 ft.) is seldom experienced but may occur, at times, in the infrequent showers or thunderstorms. Visibility is generally good or very good but is poor at times in dust or sandstorms and (infrequently) in heavy rainfall.

57. In the transition months of April–May and October–November, winds are more variable in direction than during the monsoon seasons, but are still largely east or north-east. Winds are mainly light or moderate; they are occasionally strong, but gales are very infrequent. In many areas, particularly inland, this is the wettest part of the year. Cloud amounts average 1–2 eighths in the Berbera area and probably 2 to 3 eighths elsewhere, in coastal areas. Visibility is generally good or very good, but poor at times in heavier showers, or in dust or sandstorms associated with strong winds.

CHAPTER 4

MAP APPRAISAL

General

1. Despite the production of useful new map series since 1956, the mapping situation is not yet entirely satisfactory. A fairly good basic series at a scale of 1 : 100,000 is now available as Y623, although it is uncontoured, relying on hachures for the portrayal of relief, and its portrayal of many remote areas is relatively inadequate.

2. At 1 : 250,000, there is no operationally reliable map, although at 1 : 500,000 complete cover has recently been produced in the World 1404 series. It is based chiefly on Series Y623 and suffers from the same inadequacies, but it has approximate form lines which give a general idea of the relief and it is a considerable improvement on previous small-scale mapping. A new 1 : 1,000,000 ICAO aeronautical chart is, in turn, being produced from Series 1404; it will be more up-to-date than the GSGS 4695 Aeronautical Chart, which is based on much earlier topographical information.

3. Two small areas which are reliably contoured form the only presently available mapping at 1 : 25,000 in the series Y823.

Grids

4. The country is entirely covered by East Africa Grid, Belts J and K.

Place Names

5. The chief authority for place names is the 1 : 100,000 series GSGS 4868 (Y623).

Gazetteers

6. There are two available gazetteers. One is based on series 2201 (Africa 1 : 2,000,000), published in 1947, and the other on Y401 (East Africa 1 : 500,000), published in 1946. Both are becoming out-of-date.

Available Maps

7. The following table gives a selective list of available mapping, and indicates the general stock position.

SELECTED AVAILABLE MAPPING—FORMER SOMALILAND PROTECTORATE

Scale	Series No.	Title	Coverage	Date	Availability	Remarks
1 : 2,000,000	2201	Africa	Total	1943	Bulk stocks	Out-of-date information
1 : 1,000,000	GSGS 4695	R.A.F. Aeronautical Charts	Total	1957–58	Bulk stocks	Mostly based on 1950 World Aeronautical Charts with 1957–58 air information
1 : 1,000,000	I.C.A.O. (GSGS 4648)	—	Total	New edition in production, based on Series 1404		
1 : 500,000	1404	World	Total	1959	Bulk stocks	Based on 1 : 100,000 series Y623. Heights not always reliable, but otherwise fairly accurate
1 : 100,000	Y623 (GSGS 4868)	British Somaliland	Total	1956–58	Bulk stocks	Photographically enlarged from DOS 539 1 : 125,000, compiled from 1950–52 air photography. Gridded, but relief shown only by hachures
1 : 100,000	Y623	" Goings " overprint	23 sheets, covering approximately one-third of country	1959	Library reference	Manuscript overprint to Y623—photo-copies. To be reproduced during 1961
1 : 25,000	Y823	—	In progress—9 sheets produced; 5 sheets near Hargeisa and 4 sheets approximately 40 miles south of Berbera	1959–60	Bulk stocks	UTM grid. Compiled from 1951–52 and 1958 air photography, field-checked, 1958. Contoured
Town plans 1 : 5,000	Y921	Plans of Berbera, Burao and Hargeisa, published 1960, with 1959 compilation information				

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APPENDIX 1

CLIMATIC TABLES

TABLE 1.—*List of Meteorological Stations*

Station	Latitude °N.	Longitude °E.	Height (ft.)
Zeila	11° 33′	43° 05′	10
Borama	09° 50′	43° 10′	4,900
Wajale	09° 37′	43° 17′	5,127
Hargeisa	09° 29′	44° 05′	4,377
Go'o	09° 47′	44° 56′	5,220
Gudubi	08° 49′	45° 00′	3,335
Berbera	10° 26′	45° 02′	45
Sheikh	09° 55′	45° 15′	4,800
Burao	09° 30′	45° 35′	3,448
Elal	09° 56′	46° 17′	3,565
Do'mo	07° 53′	46° 51′	1,820
El Afwein	09° 55′	47° 15′	3,346
Daloh	10° 47′	47° 18′	6,780
Las Anod	08° 28′	47° 22′	2,313
Erigavo	10° 40′	47° 25′	5,700
Hudun	09° 09′	47° 29′	2,051
Halin (Taleh)	09° 06′	48° 25′	2,093
Buran	10° 13′	48° 47′	3,140

TABLE 2.—*Mean Monthly Temperatures (°F.)*

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Zeila ...	76	77	79	84	86	91	94	93	89	83	79	77	84
Borama ...	62	67	69	72	73	76	74	73	73	69	64	61	69
Hargeisa ...	64	67	71	73	75	76	75	75	75	71	67	65	71
Berbera ...	76	77	79	83	88	97	97	97	93	84	79	77	86
Sheikh ...	58	61	65	67	70	73	71	71	72	66	61	59	66
Burao ...	67	70	73	75	77	77	76	77	78	73	70	67	73
Las Anod ...	69	73	73	77	79	77	77	77	79	77	75	73	75
Erigavo ...	59	61	63	65	67	67	67	67	65	62	60	58	63
Southern England													
Kew (London)	39	40	43	47	53	59	63	62	57	51	44	41	50

TABLE 3.—*Mean Daily Maximum Temperatures (°F.)*

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Zeila ...	83	85	86	93	94	100	105	103	97	91	87	84	92
Borama ...	74	79	81	84	85	88	85	83	85	83	77	73	81
Hargeisa ...	77	81	85	86	88	88	86	86	87	85	80	77	84
Berbera ...	84	84	86	89	96	107	107	106	103	92	88	85	94
Sheikh ...	70	73	78	80	83	84	83	83	84	79	74	70	78
Burao ...	80	83	86	88	89	88	85	87	89	86	82	80	85
Las Anod ...	81	86	89	89	89	88	87	88	91	89	87	84	87
Erigavo ...	76	78	78	80	80	79	79	79	78	77	75	74	78
Southern England													
Kew (London)	44	45	49	55	62	68	71	70	65	57	49	45	57

TABLE 4.—*Mean Daily Minimum Temperatures (°F.)*

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Zeila ...	69	70	73	75	78	81	83	83	81	76	72	69	67
Borama ...	50	55	58	60	62	64	63	63	62	54	51	48	57
Hargeisa ...	51	53	57	61	63	64	63	63	63	56	54	52	58
Berbera ...	68	71	73	77	80	86	88	87	84	76	71	68	77
Sheikh ...	46	49	52	55	57	62	60	60	60	53	49	48	54
Burao ...	55	57	60	63	65	67	67	67	67	61	58	55	62
Las Anod ...	56	59	58	66	68	65	67	67	67	66	64	61	64
Erigavo ...	42	45	47	50	53	55	56	56	53	47	45	42	49
Southern England													
Kew (London)	35	35	37	40	45	51	55	54	50	44	39	36	43

TABLE 5.—*Mean Monthly Precipitation (in inches)*

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Zeila ...	0·5	0·2	0·2	0·7	0·3	*	0·1	0·2	*	0·3	1·0	0·5	4·0
Borama ...	0·6	0·7	1·6	2·1	2·3	1·6	2·6	4·6	2·7	0·4	0·7	0·1	20·0
Wajale ...	*	0·4	1·4	2·2	2·8	2·3	2·8	3·6	3·0	0·3	0·6	0·3	19·7
Hargeisa ...	0·1	0·3	1·0	2·4	2·4	2·3	1·7	3·2	2·3	0·4	0·3	*	16·4
Go'o ...	0·2	0·3	1·0	2·7	3·7	3·3	2·1	3·3	4·1	1·9	1·3	0·3	24·2
Berbera ...	0·3	0·1	0·2	0·5	0·3	*	*	0·1	*	0·1	0·2	0·2	2·0
Sheikh ...	0·2	0·5	1·3	3·1	3·0	1·5	1·3	2·1	2·9	2·8	1·0	0·6	20·3
Burao ...	0·1	*	0·2	1·2	2·3	0·7	0·4	0·5	1·0	0·8	0·5	0·1	7·8
Elal ...	0·2	*	0·6	2·5	1·7	0·5	*	0·4	1·1	0·7	0·8	0·4	8·9
Do'mo ...	*	0	0·1	0·9	3·2	0·2	*	0	0·4	1·7	0·3	*	6·8
El Afwein ...	0·4	0·0	0·1	1·2	1·2	0·8	0·0	*	0·4	0·5	0·6	*	5·2
Daloh ...	0·7	0·0	0·4	3·2	6·1	6·0	1·0	4·8	8·5	1·6	0·3	0·3	32·9
Las Anod ...	*	0·0	*	0·6	1·6	0·1	0·0	0·0	0·8	1·2	0·3	0·1	4·7
Erigavo ...	0·7	0·5	1·3	1·5	3·2	2·5	0·4	1·6	4·5	0·3	0·5	0·1	17·1
Hudun ...	0·0	0·0	*	0·1	1·8	0·5	*	0·0	0·5	0·6	0·2	*	3·7
Halin (Taleh)	*	0·0	*	0·3	1·3	0·3	0·0	0·0	0·4	0·6	0·2	0	3·1
Buran ...	0·2	0·0	0·1	0·3	1·0	0·4	0·0	0·0	0·4	0·1	0·2	0	2·7
Southern England													
Kew (London)	2·0	1·5	1·5	1·7	1·7	2·0	2·3	2·2	2·0	2·5	2·3	2·2	23·9
Plymouth ...	3·3	3·0	2·9	2·3	2·1	2·2	2·8	3·1	2·5	4·0	3·7	5·0	36·7

* Less than 0·1 inches.

TABLE 6.—*Average Number of Days with Precipitation (0·04 inches or more)*

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Hargeisa ...	0·1	0·1	2	4	6	8	5	9	8	3	0·6	0·5	46
Berbera ...	0·6	0·6	0·5	0·7	0·8	0·1	0·3	0·5	0·4	0·2	0·3	0·4	5
Erigavo* ...	1	3	6	5	8	9	1	5	15	1	2	0·3	56
Southern England													
Kew (London)*	16	13	14	13	12	12	12	13	12	17	16	17	167

* 0·008 inches or more.

TABLE 7.—*Maximum Rainfall in 24 hours (during the period stated) (in inches)*

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Zeila ...	2·1	1·3	0·6	3·3	1·5	*	0·3	0·5	0·4	1·9	5·7	3·8	5·7
Borama ...	2·4	3·3	1·8	1·8	2·3	1·9	1·3	2·8	2·2	0·9	1·9	0·7	3·3
Hargeisa ...	1·8	1·7	2·8	2·7	1·9	2·0	2·0	2·4	1·9	1·3	1·5	0·6	2·8
Berbera ...	1·8	1·5	5·2	2·3	2·6	0·9	0·8	0·6	0·7	1·1	1·9	1·3	5·2
Sheikh ...	0·5	4·2	4·5	3·1	2·6	2·5	3·7	2·3	1·9	2·3	2·1	1·7	4·5
Burao ...	1·0	0·4	1·1	2·4	3·2	1·1	1·3	1·6	2·1	2·1	3·1	0·5	3·2
Erigavo ...	1·2	1·3	2·4	1·9	3·0	2·0	0·9	0·7	1·4	0·3	1·0	0·4	3·0
Southern England													
Kew (London)	1·6	1·1	0·8	1·2	1·8	2·4	2·3	2·1	1·6	1·4	1·3	1·5	2·4
Plymouth ...	1·5	1·4	1·5	1·1	1·6	2·2	1·8	1·9	1·5	2·2	2·2	1·7	2·2

*0·008 inches or more.

TABLE 8.—*Average Relative Humidity (per cent.)*

Station	Local time	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Hargeisa	0600	86	82	79	78	78	73	72	71	72	74	80	89	78
	0900	69	62	55	55	58	57	50	56	53	47	56	64	57
	1500	36	32	31	34	32	32	37	37	34	30	36	42	37
Gudubi	0800	41	46	46	44	45	42	40	40	37	43	39	46	42
Las Anod	0800	70	78	77	69	71	72	70	67	72	71	73	66	71
Burao	0800	52	54	53	54	52	49	48	46	45	48	47	46	49
Berbera	0500	87	87	86	89	80	51	45	44	52	78	81	84	72
	0800	76	77	77	79	71	52	46	45	49	69	73	71	65
	1400	69	70	71	73	66	46	43	46	50	65	66	68	61
Erigavo	0800	42	55	59	69	67	70	64	65	70	53	37	43	58
	1400	34	35	42	56	51	48	43	49	55	43	34	37	44
Sheikh	0800	74	70	64	59	64	67	71	67	66	64	67	68	66

TABLE 9.—*Average Cloud Amount in Oktas (eighths)*

Station	Local time	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Berbera	0900	3·0	3·0	2·3	1·9	1·2	1·0	1·7	1·4	0·9	1·0	1·5	1·8	1·7
	1500	2·0	1·8	1·6	1·9	1·7	1·0	1·6	1·4	1·3	1·3	1·5	1·6	1·6
	2100	1·2	1·0	1·0	1·5	2·0	1·0	1·7	1·8	1·7	1·1	1·0	0·9	1·3
Hargeisa	0900	2·7	2·2	2·2	2·7	2·8	2·6	2·9	2·7	1·3	1·6	2·3	2·6	2·4
	1500	1·8	2·2	2·9	4·8	5·2	4·2	4·4	4·6	5·0	3·4	2·4	2·3	3·6
	2100	2·3	3·6	2·0	2·9	3·9	3·5	3·6	3·4	3·9	1·9	2·1	2·6	3·0
Southern England														
	GMT													
Kew (London)	0700	6·0	6·2	5·7	5·8	5·4	5·2	5·0	5·2	5·4	5·6	6·2	5·7	5·6
	1300	6·1	6·0	5·4	6·3	6·0	5·8	5·8	5·8	5·5	6·1	6·4	6·3	5·9
	2100	5·2	5·0	4·5	4·7	4·7	4·8	4·8	4·1	3·9	4·5	5·3	5·5	4·7

TABLE 10.—*Percentage Frequency of Swell of Different Intensity and Direction*

Note.—This and the following table show, respectively, the percentage frequency of swell of different intensity and direction and the percentage frequency of four classes of wave heights (sea and swell) for the Gulf of Aden. There is a partial overlap given in these tables; the latter is based on more recent and detailed data. The figures are representative of the open water, mainly on the trade route; no direct information is available of sea surface conditions close to this coast, but it may be inferred that with onshore winds the waves of the open sea are reproduced right up to the shore, whereas with offshore breezes their heights will be considerably reduced, probably up to ten miles from the coast.

Swell

Area: 10–20° N., 40–50° E.

	Intensity (per cent.)				Direction (per cent.)					
	Heavy	Moderate	Slight	No swell	Confused	NW.	SW.	SE.	NE.	No. of obs.
January ...	3	30	38	29	2	4	1	43	21	717
February...	2	23	46	29	1	13	2	30	25	950
March ...	1	22	48	29	2	11	1	34	23	1,059
April ...	1	15	43	41	3	12	4	25	15	1,134
May ...	0	7	28	65	2	8	1	15	9	905
June ...	0	13	43	44	2	20	22	11	1	948
July ...	2	26	37	35	5	14	33	12	1	791
August ...	0	15	40	45	4	16	27	8	0	799
September	0	7	38	55	3	15	11	11	5	536
October ...	0	12	39	49	2	4	1	27	17	778
November	1	26	45	28	2	1	0	43	26	886
December	1	17	47	35	1	4	1	34	25	732

Note.—Totals for " direction " fall short of 100 by an amount equal to the frequency of " no swell ".

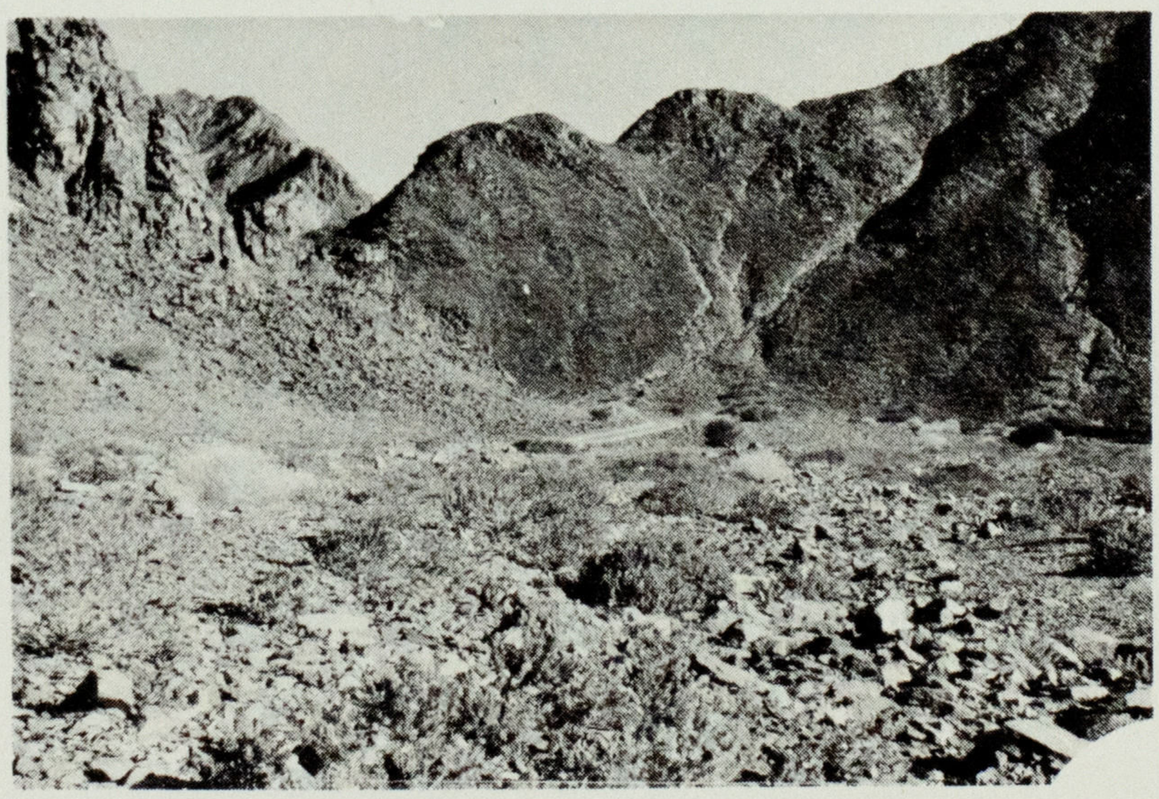
TABLE 11.—*Percentage Frequency of Wave Heights*

Area: Gulf of Aden

	0–5 ft.	5–12 ft.	12–20 ft.	Over 20 ft.	No. of obs.
January	94·18	5·33	0·38	0·9	1,031
February ...	96·58	2·73	0·45	0·22	879
March	96·04	3·64	0·10	0·20	987
April	98·85	1·14	—	—	963
May	99·04	0·85	0·10	—	940
June	90·53	9·13	0·33	—	898
July	76·68	21·94	1·27	0·9	1,098
August	86·54	12·61	0·52	0·31	959
September ...	96·28	3·50	0·20	—	970
October	97·74	1·73	0·52	—	1,151
November ...	96·52	3·21	0·26	—	1,152
December ...	92·25	7·36	0·37	—	1,072

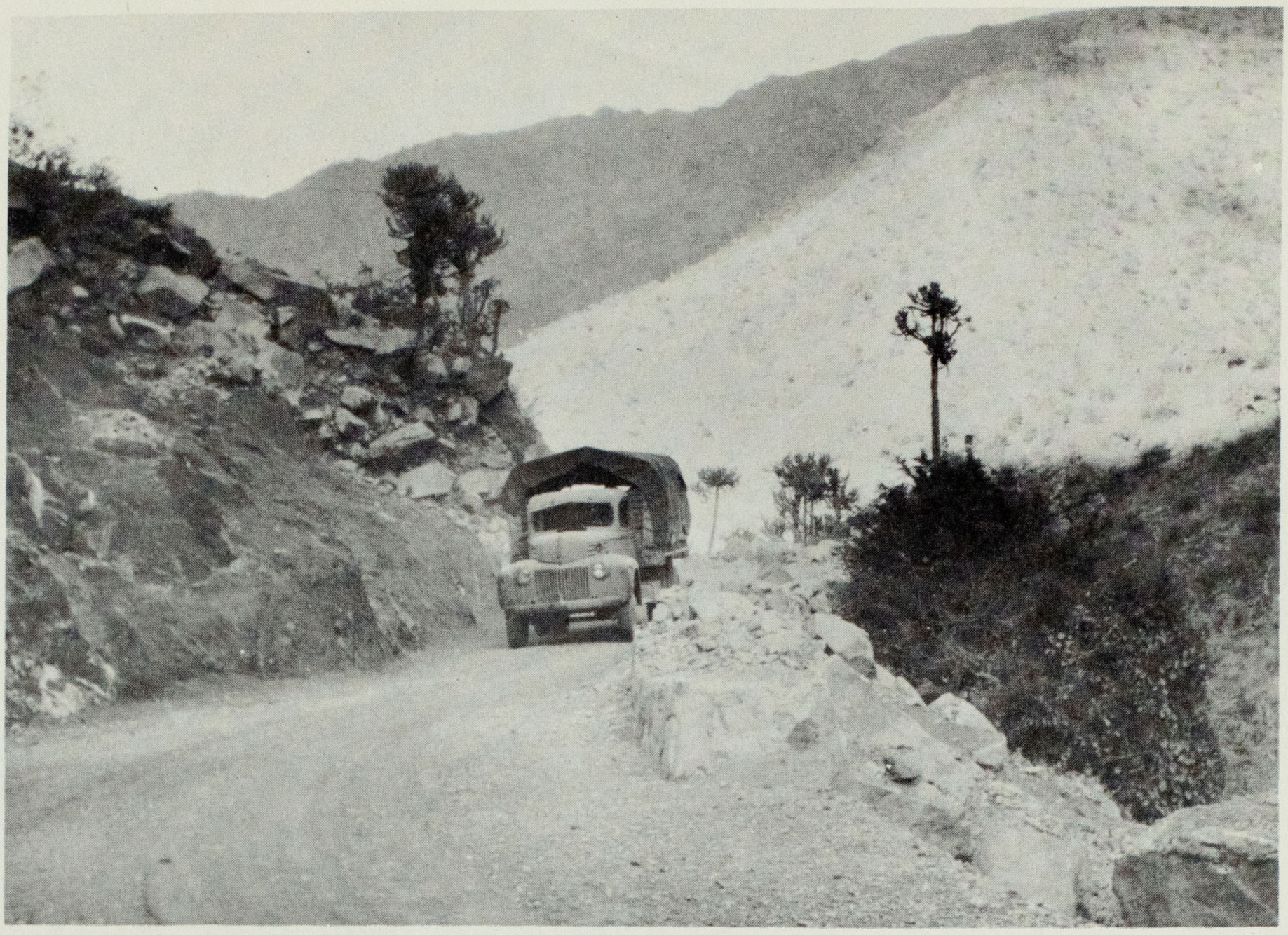
1. Coastal Plain

Typical sand and scrub terrain East of Zeila. The Berbera-Zeila road 58 miles SE. of Zeila with Mount Elmis in the background.



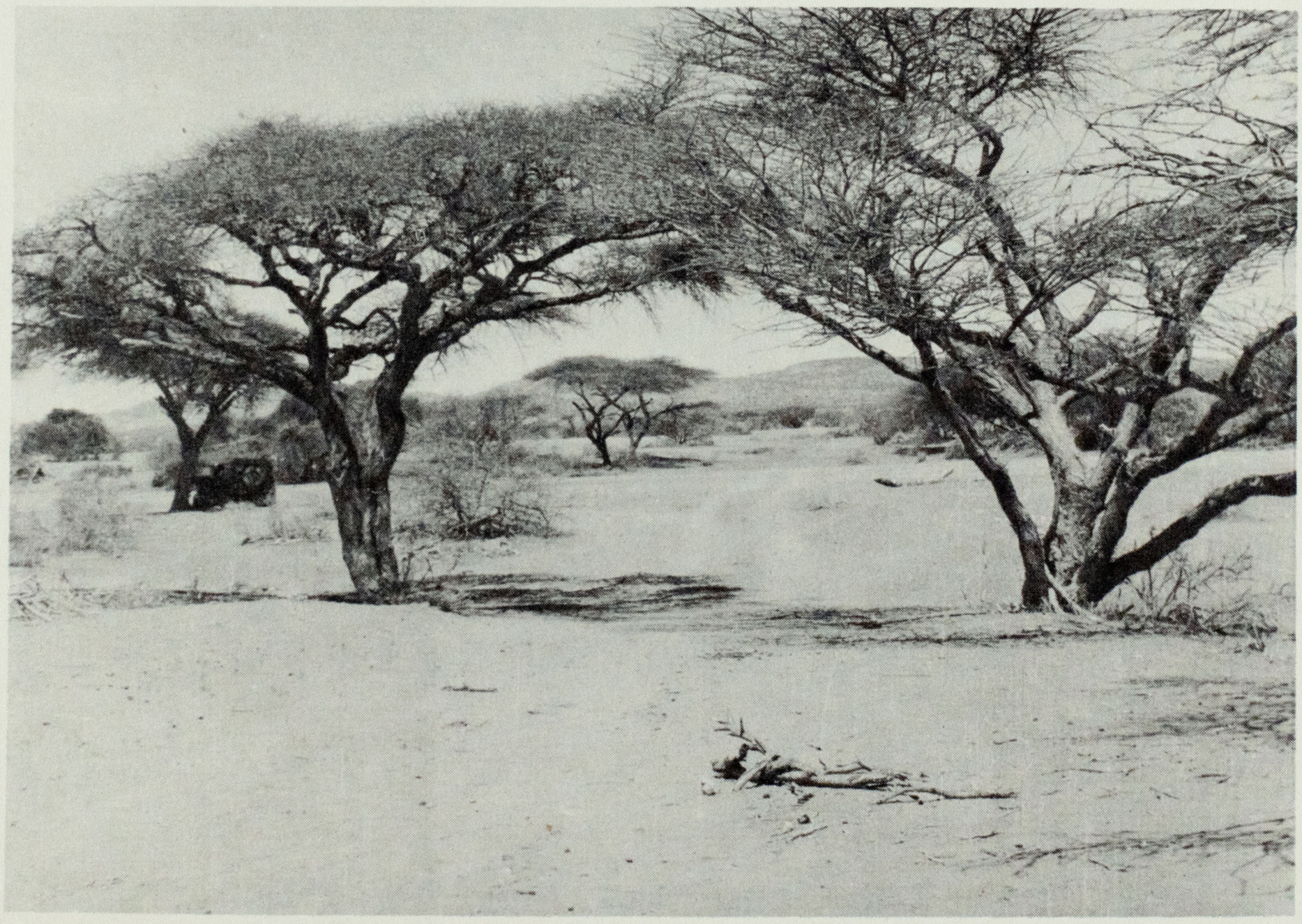
2. Coastal Plain

Coastal road passing through a defile SW. of Mait: about 7 miles SW. of Mait.



3. <u>The Plateau Edge</u>

The Sheikh Pass on the Berbera-Burao road, 38 miles S. of Berbera.



4. <u>Interior Plateau</u>

Plateau and hill country S. of Las Anod: a tug bed crosses the centre foreground. The Las Anod—Galadi road 16½ miles S. of Anod.

DEFE 60/28

D/6/VIII(A)(1) CONFIDENTIAL

SOMALI REPUBLIC

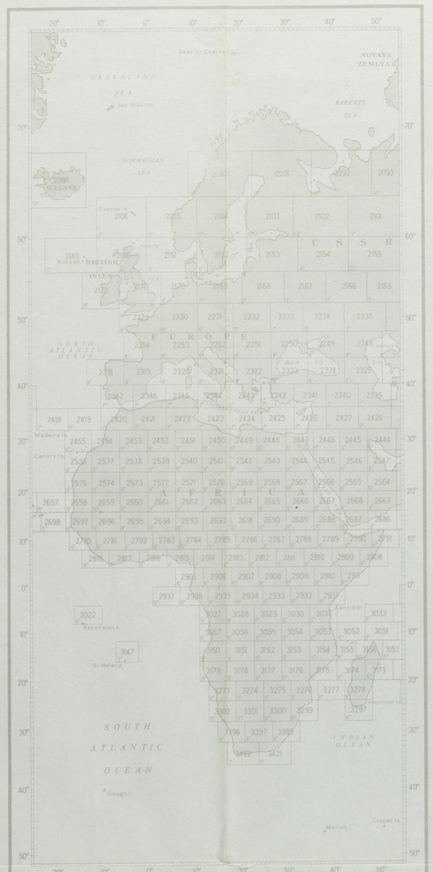
MAP 1

Physical Features

CONVERSION TABLE

FEET METRES

32,808 10,000
32,000 9500
31,000 9000
30,000 8500
29,000 8000
28,000 7500
27,000 7000
26,000 6500
25,000 6000
24,000 5500
23,000 5000
22,000 4500
21,000 4000
20,000 3500
19,000 3000
18,000 2500
17,000 2000
16,000 1500
15,000 1000
14,000 500
13,000 0 METRES
12,000
11,000
10,000
9000
8000
7000
6000
5000
4000
3000
2000
1000
FEET 0



G.S.G.S. 4622

WORLD AERONAUTICAL CHARTS, R.A.F. 1:1,000,000

(For charts available see R.A.F. Map and Chart Catalogue)

G.S.G.S. 4695

R.A.F. 1:1,000,000 AERONAUTICAL CHARTS (BASED ON U.S.A.F. WORLD AERONAUTICAL CHARTS)

(For charts available see R.A.F. Map and Chart Catalogue)

CONVERSION TABLE

FEET METRES

32,808 10,000
32,000 9500
31,000 9000
30,000 8500
29,000 8000
28,000 7500
27,000 7000
26,000 6500
25,000 6000
24,000 5500
23,000 5000
22,000 4500
21,000 4000
20,000 3500
19,000 3000
18,000 2500
17,000 2000
16,000 1500
15,000 1000
14,000 500
13,000 0 METRES
12,000
11,000
10,000
9000
8000
7000
6000
5000
4000
3000
2000
1000
FEET 0

WORLD COVER

Chart coverage of the World at the scale of 1:1,000,000 is provided by several series, as follows:–

G.S.G.S.4695 RAF 1:1,000,000 Aeronautical Charts
(Based on USAF. World Aeronautical Charts)

G.S.G.S.4622 World Aeronautical Charts, RAF 1:1,000,000.
(All of which are newly compiled)

U.S.A.F. World Aeronautical Charts 1:1,000,000
(These maps are for use in areas not yet covered by one of the above series)

CULTURE

Built-up Areas (Black) — Size of Type indicates Relative Importance

Metropolitan Area (Black Stipple, Ruling or Grey Filling)
Large City
City
Small City
Town
Village

Railways (Black)

Railway (Single track)
Railway (Two or more tracks)
Railway (Abandoned or Under Construction)
Railway Bridge (landmark)
Railway Tunnel

Roads (Red)

Dual Lane Highway
Primary Road
Secondary Road
Other Roads
Road Bridge (landmark)
Road Tunnel

Miscellaneous (Black)

Oil Tanks
Oil Field
Pipe Line
Mountain Pass
Mine
Lookout Tower
Race Track
Fort
Dam
Telegraph or Telephone Line (When a landmark)
Power Transmission Line
Stranded Wreck
Church
Mosque
Temple
Pagoda
Landmarks
Isolated Building
Ruins
Boundaries (International)
Boundaries (State)

AERONAUTICAL INFORMATION

(ELECTRIC BLUE)

	Land	Water
Aerodrome Military	○	◎
Aerodrome Joint Civil and Military	◇	◈
Aerodrome Civil	◇	◈
Landing Ground	○	
Aerodrome disused and may be unfit for use	⊗	
Sheltered Anchorage		⚓
Obstruction (Unlighted)	⋀699	
Obstruction (Lighted)	⋀925	

Numerals in italics indicate elevation above sea level at top

Marine Light (with characteristic) — e.g. Fl (3) 20 ft 10 m
Lightship (Centre of circle)

Marine lights are white unless colours are stated.

Isogonal — 5½° E (1959)
Mooring Mast
Dirigible Base
Town having Visual Ground Sign — LONDON
Prominent Transmission Line

TOPOGRAPHY

Black

Charted Isolated Rock
Highest Elevation on Chart (in Feet) — 1368
Certain Selected Elevations (in Feet) — 1257
Spot Elevation (in Feet) — 672
Danger Curve for 2 Fathom Marine Contour
Unusual Land Features Appropriately Labelled — Salt Pans; Dark Area

Brown-Relief (with Purple Hypsometric Tints)

Contours (For vertical intervals see Hypsometric Box in left margin of chart)
Approximate Contours
Hachures (Prominent isolated hill features not shown by Contours)
Bluff, Cliff or Escarpment
Lava flow

Brown-Relief (Cont'd)

Sand Dunes
Sand Area
Gravel
Levee or Esker
Rock Outcrop

HYDROGRAPHY

Brown and Blue

Dry Lakes and Salt Flats
Dry Washes
Glaciers
Shoals and Sand Bars

Blue

Shore Line (Reliable)
Shore Line (Unreliable)
Mud and Tidal Flats — Mud Flats
Breakers
Covered Reef
Coral Reefs and Ledges
Large Rivers (Perennial)
Small Rivers (Perennial)
Rivers and Streams (Non-perennial)
Rivers and Streams (Unsurveyed)
Rapids and Falls
Canal
Canal Abandoned
Lakes (Perennial)
Lakes (Non-perennial)
Salt Lake
Swamp
Flood Marked Areas
Sand Deposits in river bed
Spring
Well and Water Hole
Reservoir
100 Fathom Marine Contour

D/6/VIII (A)(1)

TERRAIN REGIONS

CAN/UK/US EYES ONLY
UNCLASSIFIED

MAP 2

FRENCH SOMALILAND

Djibuti

Zeila

GULF OF ADEN

Durdureh

Elayu

Las Khoreh

Manna Hills

Mait Island

Hashau

Mait

Heis

1c

AL HILLS

2

Ras Khanzira

Khor Shari

Ras Sudda

Ras Katib

Ankhor

Raguda

Shimber Beris

Medishe

Erigavo

Haberru

3c

BERBERA

Mt. Elmis

Bulhar

1b

GUVENEH RANGE

Perim Range

ASSEH GAP

Las Dureh

el Dur Elan

Buran

1a

HEMAN BASIN

3b

El Afweina

Borama

Mandera

Upper Sheik

Adadle

2

El Der

Hargeisa

Burao

Odweina

Ber

Guled Haji

3a

3c

Hudun

Halin

SOMALIA

Eik

Ainabo

Las Anod

ETHIOPIA

Bohotleh Wein

LEGEND

Regional Boundaries
Sub-Regional Boundaries
International Boundaries

1: Coastal Plain and Foothills
- 1a: Western Foothills & Zeila Plain
- 1b: Central Plains & Limestone Hills
- 1c: Eastern Foothills & Coastal Plain

2: High Plateau Edge

3: Interior Plateau and Plains
- 3a: The Haud
- 3b: The Sawl Haud
- 3c: Nogal & Daror Valleys & Surrounding Limestone Hills

Scale 1:1,000,000

Miles 10 0 10 20 30 40 Miles

Kilometres 10 0 10 20 30 40 50 60 70 Kilometres

U.K. C.C.S. DIR. OF MILITARY SURVEY, SURVEY 3
MAP LIBRARY CATALOGUE REFERENCE
22 AUG 1961

51091 (M.F.P.)

Compiled and Drawn by J.I.B. January 1961

D/6/VIII (A) (1) CONFIDENTIAL

SOMALI REPUBLIC

MAP 2

Terrain Regions

DEFE 60/28

Series GSGS 4695
Sheet 790
Edition 2-GSGS

DANGER AREAS, LIGHTED AND UNLIGHTED OBSTRUCTIONS ARE NOT SHOWN ON THIS CHART

ELEV. IN FEET

R.A.F. 1:1,000,000 AERONAUTICAL CHART

(BASED ON U.S.A.F. WORLD AERONAUTICAL CHART)

(790) CAPE KHANZIRA

ELEV. IN FEET

STATUTE MILES

GEOREF
INCIDENCE OF 15° QUADRANGLES ON THIS SHEET
OG | 45°E | RG

To reference by Georef to minutes
Select nearest degree intersection south and west of point.
Example AINABO
1. RG identifies basic (15°quadrangle (shown in left)
2. BJ identifies 1° square
3. 26 identifies Georef minute of longitude (Easting)
4. 57 identifies Georef minute of latitude (Northing)
5. Reference example: RGBJ2657

(Joins 687) (Joins 686) (Joins 789) (Joins 791) (Joins 809) (Joins 808)

GULF OF ADEN

FRENCH SOMALILAND
BRITISH SOMALILAND

Obock · Ras Bir · Ras Duan · Moudjo · Anengaultra · Iles Moucha · Ile Maskali · GOLFE DE TADJOURA · Occ. 60 secs. · DJIBOUTI · Aibat Island · Chebele · Loyada · Saada Din Island · Zeila · Ras Maskan · Hersa Boh · Sihl · Lander · Baun Dera · Gora Ad · Aret · Armaleh · Hemal · Jire · Qaxton · Bukhale · Saba Wanak · Qulih · Kabri Bah · Hedidat · 5705 WOBLE · 6014 AFTON · El Ante · Waran Weri · Kablieh · Taraneh · Salal · Durai · Dawi · Faron · Samatara · Lafer Ug · Nabiseh · Daragodleh · Ago Meroden · Bulhar · Lubba Gorih · Demis · El Sheikh · Burris · Helm · Ambaliteh · Batalaleh · BERBERA · 100 FATHOMS · BERBERA 30 · Ras Khanzira · Karin · Khor Shorl · Ras Hamra · 1771 TREE HILL · Ras Sudda · Yos · Dayet Gal · El Durad · Dur Dii · Ras Walhun · Ras Katib · 1256 · Kabal · El Girdi · Tar · Las Musa · Ankhor · Ghubbet Raguda · Las Umbarleh · Hutano · Las Urwein · Raguda (Ruin) · Ras Shulah · Lahan Sheikh · ANKHOR PEAK 3700 · 4890 MULLAH · Hudunle · Ras Jilbo · Heis Island · Heis · Malt (Ruin) · Galbanbur · Mait Island · Ras Sura · Bandar Harshau · Bargunten · Humbeis · Ghubbet Kalwein · 100 FATHOMS · Geluweda · Kilma Adwein · Goriad · Las Khoreh · Damaleh · Ras Las Mahan · Las Mahan · Ras Gaan · Gaan · Ras Dofdulen · Durdureh · Ras Adado · Adado · Las Mehien · Mabla · Solid · Las Hulia · Las Bar · Elayo · Mardo · El Dibla · Durbur Malo · Sherlani · Dana · Beirara · Mon Aled · Damadadi · 6001 · 5600 · 5102 · El Ad · Bohatya · Baran · Rat · Lomashy · Domo · Angor · Hiben · Las Edad · Harmo · Olla Hulia · Durraw · Hobad · Dareli · Angoro · Huran 3478 · Jilla · Ararali · El Haga · Elel Higli · Massapan · El Der · 4948 · Daman · Ilad · Kalsheikh · Galgel · Las Dureh · Gafardigu · Oloweina · El Dur Elan · Subale · Dabat Dehad · Taiolaha · Dudun · Ambal · 3914 · 3340 · 3602 · 5629 · Hagal · Badon · Biyo Dader · Dahan · 3116 · 2631 · Gabileh · 3185 · Kaldareh · Ogili · Las Dur · Lerhaimyaso · 3815 · 4146 · 6567 · Lower Sheikh · Upper Sheikh · 6522 · Galmadub · Gedeis · Bardeeg · Diria · 5134 · Dongorre · 5810 · Ermah Kalat · El Merigleh · Manje Maganche · Las Ade · KURA HILLS · 4933 · 5253 · 3707 · Daba Dalol · El Afweina · 3458 · El Midgan · Gerder · Dabanoh · 3973 · Darimo · 3022 · Gulpakha · Tug Der · Waridud · Elkadalanle · Ber · 3406 · Adad · 2776 · HAGRIN RANGE · Hudun · Sigerder · Didayha · Hansoga · Taleh · Haradle · Yaheima · 2516 · Ashmat · 2703 · El Hadoto · Halin · Wailoo · Danan Gaolod · Gebider · Las Worwar · Hadigunh · Rehel · Dumei · Wimir · Cal · El Chebet · Lanle · Bukh Goreyo · Gambaiyah · Sigerdero · Buddo · Aide Jiffifta · Arorle · El Mado · Galgolah · Scimbirale · 1076 · Sinugif · Damberi · El Anellei · Futubat · Cohelei · Garoe · Laba Higlo · Rabalieh · Las Anelot · Donkukog · Jibaganleh · Las Durre · Garamo · Farddidden Dhar · DAN GUDBAN HILLS · Kalila Kabe · Beratable · Bukh Shanle · Las Anod 2000 (APPROX.) · 2526 · Gabal · Gabader · Darin · Baran · El Dibir · Aia Bentih · Bohodle · Daua Ali · Hiltu · Fantaweina · Cabrin · Dinleh · Durunti · Qus Biyaad · Gos · Qaradugo · Gondolibah · Hagoga · Daror · Auareh · 3717 · Galolkale · Hajl Nur · Hascul · Galkagudubi · Daveboriale · Dibber Uln · 4526 · Dagabur · Tar-Hal · Goddi · Fuusto · Gorer · Hara Califo · Gaho · Arah Arre · 4393 · 5381 · Tug Wajale Post · 6386 · 6027 · Au Barre · Dirbi Gopesa · Gibiles · Uldn · Anagor · Tug Wajale · 6269 · Uodda Macahil · Uodda Ferauclna · Dibile · Au Calaf · 4400 · Uodda Gumar · HARGEISA · HARGEISA 4390 · 4800 · Bederwanak · Biyo Bakhdai · Biyo Ado Gurbile · Omawara · Datweina · Aubakhadle · Adadle · Talaba Yer · Bale Dobeheya · Bale Khalid · Odweina · Eik · BURAO · BURAO 3400 (APPROX.) · Ohasan Ft. · Knit · Wedamago · Ainabo · AINABO 3000 (APPROX.) · Laba Afle · El Dab · Dere Ere · Arigere · 3937 · 3953 · Didera · 3543 · Libah Hale · 2871 · Horufadi · Shilbie · Las Kudusino · Higlole · 3225 · Jana Jifta · Adele · Joole · Tursubuk · Aide Jiffifta · Arorle · Darin · Las Anod · 2526 · Bukh Shanle · Beratable · El Dibir · Baran · Las Durre · Garamo · Farddidden Dhar · Kalila Kabe · DAN GUDBAN HILLS · Donkukog · Las Anelot · Jibaganleh · 2461 · Garoe · Laba Higlo · Rabalieh · Futubat · Cohelei · Scimbirale · 1076 · Sinugif · Damberi · El Anellei · Galgolah · Buddo · Bukh Goreyo · Lanle · Rehel · Dumei · Wimir · Cal · El Chebet · Hadigunh · Gambaiyah · Danan Gaolod · Gebider · Las Worwar · Taleh · Haradle · Yaheima · 2516 · Ashmat · 2703 · El Hadoto · Halin · Wailoo · Hansoga · Hagrin Range · Hudun · Sigerder · Didayha · Gosawein · Jana Jifta · Adele · Joole · Tursubuk · Las Kudusino · Higlole · Horufadi · Shilbie · Las Anod 2000 (APPROX.) · 2526 · Gabal · Gabader · Darin · Baran · El Dibir · Aia Bentih · Bohodle · Daua Ali · Hiltu · Fantaweina · Cabrin · Dinleh · Durunti · Qus Biyaad · Gos · Qaradugo · Gondolibah · Hagoga · Daror · Auareh · 3717 · Galolkale · Hajl Nur · Hascul · Galkagudubi · Daveboriale · Dibber Uln · 4526 · Dagabur · Tar-Hal · Goddi · Fuusto · Gorer · Hara Califo · Gaho · Arah Arre · 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BRITISH SOMALILAND
ETHIOPIA

PM QM AM BM CM DM
PL QL AL BL CL DL
PK QK AK BK CK DK
PJ QJ AJ BJ CJ DJ

KILOMETRES · NAUTICAL MILES

ELEVATION TINT LEGEND
HIGHEST ELEVATION KNOWN IS 7900
7000 5000 3000 2000 1000 Sea Level
ELEVATIONS ARE IN FEET
CAUTION: Grouped into red tinted by dotted contour lines indicate approximate relief only

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Sheet 790
Edition 2-GSGS

AIR INFORMATION AS AT OCT 1957
SUPPLIED BY THE MINISTRY OF DEFENCE (J.I.B.S)

THIS MAP IS NOT AN AUTHORITY ON INTERNATIONAL BOUNDARIES.

Lambert Conformal Conic Projection
Standard Parallels 7° and 20°

SCALE 1:1,000,000

LEGEND AND INDEX ON REVERSE SIDE

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MAP LIBRARY CATALOGUE REFERENCE 22 AUG 1961

ELEV. IN FEET

MAGNETIC VARIATION (1960) ON THIS SHEET FALLS BETWEEN 00°15'E AND 00°58'W AT CENTRE OF SHEET IT IS 00°18'W OF TRUE NORTH. ANNUAL CHANGE NEGLIGIBLE

CAPE KHANZIRA (790)

ETHIOPIA-SOMALILAND-SOMALIA

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